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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

June 26, 1937

For Milady's Cape

See Page 406

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of

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Edited by WATSON DAVIS

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DO YOU KNOW?

Locomotives are now being equipped with electric speedometers.

Egypt's famous crocodiles and ibises have become extinct along the Nile.

Ancient Romans believed that laurel—a sacred tree—could not be struck by lightning.

The Chinese are credited with having invented more ingenious devices for catching fish than any other people.

Washington City's rose garden in West Potomac Park has nearly 6,000 rose plants, representing 121 varieties.

The new Moscow-Volga canal, which divides Europe from Asia, enables steamships to voyage from Persia to the Arctic ocean.

Java is credited with having launched one of the best adapted projects in general health education for adult population in the world.

To reproduce the country life of George Washington's time at his birthplace, Wakefield, Virginia, a flock of sheep, a herd of Hereford cattle and a flock of wild turkeys are established there.

A German invention is a small electric fret-saw, operated by an alternating current magnet and a suspended steel membrane.

Scientists from Finland are hunting in Labrador for evidence that North America and Europe were once joined in the Far North.

The world's largest geyser is the Giant Geyser in Yellowstone National Park, which erupts to an average height of 200 to 250 feet.

British archaeologists are digging out the main outlines of England's biggest Stone Age Town, a Neolithic settlement at Maiden Castle.

Magnolias 25 to 30 years old have been transported from North Carolina, to beautify the grounds for new Federal buildings in Washington, D. C.

Aliens in the United States have been decreasing so notably that one immigration official observes that in ten years an alien may be comparatively rare.

Diphtheria once killed over 30 children in every 100,000 of population in this country, but immunizing children has greatly reduced this cause of death.

WITH THE SCIENCES THIS WEEK

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ZOOLOGY

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UNNATURAL HISTORY

Sea Serpent Season Brings New Crop of Incredibilities

Real Marine Animals Account for Sea Serpent Stories, Says Veteran Biologist; Porpoise and Squid Fool Unwary

By DR. PAUL BARTSCH
U. S. National Museum

REAL creatures of the sea, known to marine biology, account for the mysterious "sea serpents" described by excited observers.

To sum up my own experiences with sea serpents:

First of all, once when we were in the lagoon of South Reef off Sitanki in the southern end of the Philippines, as the sun was setting, looking eastward to the bordering reef of the shallow lagoon, a friend and I standing at the rail were both thunderstruck at beholding a sea serpent at the edge of the reef at a considerable distance.

"A Row of Loops"

Here were ten or a dozen loops projecting from the sea as big around as a barrel, stretching to a considerable distance as if the serpent was moving through the water near its surface. I don't think anything has quite so excited me as that vision, and, judging from the paleness of my friend's features, he seemed equally dumfounded.

Even as we stared at this phenomenon, it turned in our direction, and soon we saw it resolve itself into a series of porpoises that were playing follow-the-leader or leap-frog or whatever it is they call this pastime in which porpoises are known to indulge, breaking from the water at definite intervals as if engaged in the performance of a porpoise dance. Thus vanished my socalled Pacific sea serpent.

It was probably this experience that excited my imagination and tempted me to take a hand in the solution of the perennial sea serpent stories of the Atlantic. And so, following the scientific method, I passed in review all creatures of considerable size that might have had a part in these tales.

You can blame in part the porpoises just mentioned, and in part possibly the killer whale, Orca, for some of these yarns.

But plotting the distribution of the large sea creatures, I have come to the conclusion that we have an invertebrate that fills far better the requirements of the sea serpents as portrayed by most observers. It is the giant squid, *Architeuthis*. A specimen of this creature was washed ashore at St. Augustine a quarter of a century or so ago, the body of which was 18 feet long and about as big around as a barrel.

The giant squid is built along the line of the small common squid that we use for bait in the northland. It has eight short arms and two very long arms. The two long arms of a creature the size of the St. Augustine specimen would each have to be about 60 feet in length. They would have to be the size of a man's arm. They can be moved about with great flexibility. The outer end of the arm being expanded, has hanging from it a series of suckers which might well answer to the beard or mane frequently observed by excited, untrained persons seeing such an object.

Take these two long arms, and stretch them in opposite directions and you would have a length of 120 feet. Now give them a wavy folding, partly in and partly out of water, and you have a beautiful sea serpent, which to the startled untrained observer will seem to be at least twice if not three times as long as it really is.

Some of the pictures that have been drawn of sea serpents also show a hastate—or spear—shape. This represents the tail end of the squid with its flukes projecting out of the water.

The spouting of water in some sea serpent pictures might well be the pumping from the siphons, which the squid uses in propelling himself backward through the water.

So you have here all the elements to satisfy sea serpent tales, not only that, the distribution of the giant squid coincides well with the sea serpent tales of the North Atlantic and thus adds another element that should cause its acceptance.

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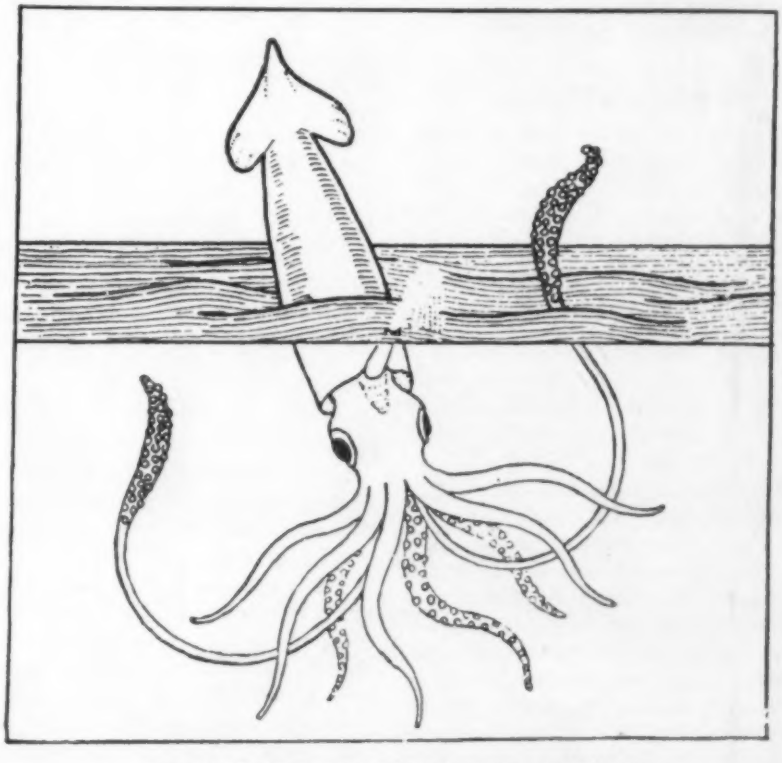

TAIL THAT'S MISTAKEN FOR A HEAD

When a Giant Squid floats head down with its tail out of the water, the pointed, lobed structure looks astonishingly like a head—even a head with ears. Squid arms, too, can be mistaken for longer, slenderer "serpents."

PHYSICS

New Theory on Cosmic Ray Origin Offered by Physicists

American and Chinese Scientists Suggest Possibility Of Terrific Explosion, Following Lemaitre's Hint

A NOBEL Prize winner in physics and a Chinese scientist joined forces, through the printed word, this week to tell the world of a new hypothesis on the origin of the cosmic ray. The men are Prof. Arthur H. Compton, University of Chicago, and Dr. P. Y. Chou, physicist at National Tsing Hua University, Peiping, China. Their medium of expression was the highly technical journal of the American Physical Society, *The Physical Review*.

In the present stage of cosmic ray knowledge, say Prof. Compton and Dr. Chou, there is no known act of nature—even the annihilation of the atomic nucleus—which can provide sufficient energy to fit the observed energies of some of the cosmic rays.

The only possibility, they feel, is the primeval explosion that sent worlds and galaxies literally rocking and reeling into space.

Particles and Photons

Every kind of particle and the packets of energy known as photons would be the debris of such a staggering catastrophe, they admit. To account for the known preponderance of electrically charged particles, they suggest that the non-charged photons and neutrons have been lost in space because they could penetrate the magnetic field of stars and galaxies. But these same magnetic fields might trap the charged particles and so produce the observed particle component of the cosmic rays.

The scientists acknowledge the expanding universe theory of Abbé LeMaitre, the Belgian scientist-priest, as the inspiration for this newest cosmic ray origin hypothesis. The Compton-Chou report is the first one in considerable time which has tackled the origin of the cosmic ray. For some years scientists have been content to study and obtain more and more experimental data, leaving the fitting together of the pieces to a later time.

Discussing the high energy of cosmic rays and their apparent origin somewhere out in space, the scientists said, "If the cosmic rays come from beyond the Milky Way, at a really typical place in intergalactic space the density of cosmic-ray energy would be of the order of 100 times as great as that of starlight. It is thus apparent that either the source of the rays must be a radiator which is very powerful compared with stars as a source of light, or the cosmic rays once emitted must be retained by the metagalactic system instead of being lost as is starlight.

"Although nuclear processes occurring in interstellar space might result in an adequate total energy," they add, "it appears that such processes are inadequate to account for the great energies of the individual cosmic-ray particles."

Concerning the trapping of the electrical particles they ask, "Is it possible that electrically-charged rays emitted by the initial explosion may be deflected by stellar or galactic fields just as a cosmic-ray electron is deflected by the earth's magnetic field? If so, those particles which would be most probably retained by the metagalactic system would be those with the highest ratio of charge to mass in order, electrons, protons, etc., whereas all neutral rays might be forever lost."

Because, on the hypothesis, the cosmic rays would spend much of their lifetime in intergalactic space they should suffer the "red shift" decay of energy in the same way that light does. "If this is true," conclude the scientists, "the energies of the cosmic rays now striking the earth must be much less than those of the rays in the early history of the earth."

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PSYSIOLOGY

Oxygen Face Tent For Pilots Advocated as Safety Measure

AN OXYGEN face tent for airplane pilots, worn at high altitudes, will make flying much safer for the public, Dr. Alvan L. Barach, Columbia University College of Physicians and Surgeons, stated in a report to the American Medical Asosciation.

Pilot error is considered a primary cause of 16 out of 27 recent airplane accidents, according to the U. S. Department of Commerce.

That oxygen want is a frequent factor in pilot error is the opinion expressed by Dr. Barach. (*Journal, American Medical Association,* May 29).

He recommends that commercial airplane companies adopt compulsory oxygen inhalation for pilots navigating at from 10,000 to 12,000 feet or over.

The oxygen face tent, which this physician recommends for use by pilots, was originally developed for the treatment of anoxemia—deficiency in the oxygen content of the blood—in clinical medicine.

Oxygen want, says Dr. Barach, is capable of producing mental impairment and certain bodily changes at altitudes at which transcontinental flying now takes place.

These changes include poorer vision, hand tremors, fatigue and reduced control of other nervous and muscular processes.

Most important—and most disastrous—of these is impairment of vision. The importance of good sight in finding a landing place is obvious.

Existing eye defects become exaggerated and unsuspected eye defects are unmasked when tests are made at high altitudes. The general visual field is found to darken.

The fact that a pilot has once been able to fly at 20,000 feet without conspicuous symptoms of oxygen want does not mean that he is a safe flyer without oxygen at 10,000 feet, Dr. Barach contends.

An aviator may be exposed to a reduced oxygen pressure at a certain period in a flight and the effects may not manifest themselves until three or four hours later when he is traveling at low altitudes.

The Columbia physician thinks that oxygen inhalation will protect flyers from premature loss of usefulness, as many men who do high flying find their "ceiling" getting progressively lower so that they cannot tolerate even such moderate altitudes as 10,000 feet.

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RADIO

Home Television Pictures Shown to Radio Engineers

A SCIENTIFIC idea that figuratively almost went into the wastebasket because it seemed too difficult to work out has now produced bright, clear television images of such size that they appear to meet the potential requirements of home users.

At the meeting of the Institute of Radio Engineers in New York scientists of the Radio Corporation of America demonstrated television pictures, 18 by 24 inches in size, that compare favorably with home motion pictures in brightness and detail.

This area of viewing screen may reasonably be supposed to represent the television set owners' wishes for size, since it is probable that future commercially-available sets will be about as large as the larger radios today. A few people may wish to devote the whole side of a room to a television screen but the feeling is that a picture about two feet square, visible across an ordinary living room, will meet the greatest demand.

Dr. V. K. Zworykin, W. H. Painter, and Dr. R. R. Law described the new type projection tube which makes possible the bright images in "living room" size. Idea behind the work is that a controlled stream of electrons strikes a fluorescent screen and by bombardment makes the screen shine so brightly that an ordinary optical system can enlarge the image to its 18 by 24 inch size.

Electrons Form Picture

These flying electrons, which ultimately form the television picture, have to pass through four "gates" before striking the fluorescent screen.

Through the first three the electrons are packed into a pencil of rays about the size of a real leadpencil. But in going through the last "gate" they must pass through a hole too small in size to allow the passage of a human hair. Getting the electrons through this tiny opening without loss and obtaining something on the opposite side was one of the "kinks" in the original idea that almost led to its abandonment before being tried.

The television engineers are now continuing their work ironing out one hampering factor in their development; that the bright, clear image can only be obtained with special laboratory equipment and with technical operators.

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TELEVISION IMAGE GROWS

Clear, detailed television images 3 by 4 feet in size were demonstrated at the recent meeting of the Institute of Radio Engineers. Dr. R. R. Law of the Radio Corporation of America stands beside the large image on the screen.

MINING

Decade of Stable Prices Foreseen For Mining Trades

DESPITE warning that the price of coal, and other mineral resources will sometime rise, economists of the U. S. Bureau of Mines and the WPA believe that in the next decade applied science can so lower costs of production that industry and the ultimate consumer will find they are paying prices prevailing in the 1920's.

But if the price stays the same, the nation and the world, too, must be prepared for accompanying problems. In some regions mineral supplies will be exhausted and stranded mining populations will have to be shifted. And increased mechanization may create local unemployment.

Worst of the new mining techniques, from the miner's side, is that of strip mining where mighty steam shovels find it economical to dig through 50 feet of soil and rock to reach a 5-feet thick seam of coal. Only a half or a third as much labor is required by this method.

Mechanical loading, too, is entering the last stronghold of hand labor in the mines. Ninety per cent. of Wyoming's mineral output is now machine-loaded, 62 per cent. in Indiana and 56 per cent. in Illinois.

The effect of increased mechanization in mining, on the short-time view, is to "inject an element of technologic unemployment in an industry where other factors have already reduced the number of jobs," says the report.

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PHYSICS

Further Studies Fail to Show Neutron Refraction

FURTHER experimentation on the possibility of refraction of neutrons in the passage through lenses of paraffin (SNL, March 13, 1937) has disclosed that the effect is absent when the research was carried into the open air to avoid spurious scattering from the laboratory. This new report of Prof. G. N. Lewis and Philip W. Schutz of the University of California is presented in the *Physics Review* for June 15.

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IN SCIENCE FIELDS

SEISMOLOGY

Earthquake Shook Mexico During Recent Eclipse

JUST when the eclipse of the sun was deepest black on Tuesday the inhabitants of Chiapas in lower Mexico had the added experience of feeling an earthquake. This was revealed by the U. S. Coast and Geodetic Survey in decoding messages forwarded by Science Service from seismological stations throughout the United States and Canada.

There was no connection, scientifically, between the two events but Mexicans who already may have been fearful of the partial blacking of the sun were put in added terror by the earth tremor.

The shock, termed "moderately" strong, occurred at 5:29.8 p. m., eastern standard time, and had its epicenter near the town of Chiapas in lower Mexico near the Guatemala boundary. The shock was of the deep focus type.

Stations reporting the quake included: Georgetown University, Washington, D. C.; Canisius College, Buffalo, N. Y.; U. S. Coast and Geodetic Survey, Tucson, Ariz.; Meteorological Observatory, Victoria, B. C.; Williams College Observatory, Williamstown, Mass., and the private seismological station of Mrs. M. M. Seeburger, Des Moines, Iowa.

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PHYSIOLOGY

Quick Stepping Saves Fire-Walkers' Feet

FIRE-walkers of India, who tread on live coals without injury to their bare feet, owe their immunity simply to the fact that they take very quick steps—and not too many of them—rather than to any quasi-magically induced mental state.

This has been demonstrated by experiments under the direction of Harry Price, honorary secretary of the University of London Council for Physical Investigation.

When the professional fire-walker, one Ahmed Hussain, stepped from end to end of an ember-filled trench 12 feet long in one and one-third seconds, his feet were unaffected by the fire. Three amateur volunteers tried following his lead on the second dash, and received slight but undoubted burns.

Then a second trench was prepared, 20 feet long and somewhat hotter than the first. When Ahmed Hussain walked through this more severe ordeal, he came out with several blisters on one foot and a decided redness on the other.

Evidently therefore getting through fire without scorching your soles is a matter of "puttin' 'em down and pickin' 'em up"—with accent on very quickly picking them up.

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CONCHOLOGY

W.P.A. Workers Trace Story of Shell Uses

SEASHELLS had monetary importance long before smooth-talking carnival "operators" found how effective three of them could be when combined with a deftly manipulated rolling pea. Ages before man learned about gold and silver his coins were shells: the pierced tiny disks that formed the wampum of our own Indians, the dentalia or tooth-shells of the West, the smooth-beautiful cowries that formed the currency of a large part of the world's warm-water coasts.

To record the monetary and other uses of shells throughout the world in an exhibit of permanent educational value is the unique undertaking of a group of W.P.A. workers in the Louisiana State Museum in New Orleans, under the direction of Dr. H. J. Boekelman of the Department of Middle American Research, Tulane University.

Shells had a multitude of uses, among races that had not yet learned the use of metal. They came ready made as a whole series of utensils and tools, some of which are still evident in traditional patterns used in other materials. The spoon in every sugarbowl is still called a sugar "shell", and often has its bowl wrought in a scallop-shell pattern. The first garden hoes were large clam or mussel shells fitted with stick handles.

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AGRICULTURE

Gold in "Them Hills" Of Sugarcane Waste

"THAR'S Gold in them thar hills" of wasted sugarcane tops and leaves that at harvest time clutter the fields of Louisiana, as well as the rest of the sugar-producing world. Wealth, not waste, should be the significance of these great mounds of trash, declares William L. Owen, consulting bacteriologist of Baton Rouge.

The "pay juice" of sugarcane, which yields the high-grade sugars of the market, is concentrated in the lower part of the stalk. Leaves and top have little of it and the cutters lop off and leave them lying in the fields. Their only economic use at present is as fuel under the mill boilers—and that is so wasteful that it can hardly be called economic.

To make his argument more vivid, Mr. Owen did a little "end-to-end" figuring. The cane trash wasted annually in the state of Louisiana alone, he said, would make a mound a quarter-mile in area and 300 feet high; it would yield juice enough to make a lake a mile square and a foot deep; the nitrates lost when it is burned represent the equivalent of 28,000 tons of Chili saltpeter.

The answer, as Mr. Owen sees it, is to express this non-commercial juice, which is rich in fermentable sugars, and convert it into alcohol for blending with gasoline as a motor fuel. Corn and other grains are proposed for this use in the nation's Midwestern "breadbasket"; he would extend the idea to include the "sugarbowl."

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ZOOLOGY

Guereza Monkeys Source Of Fashionable Fur

See Front Cover

GUEREZA monkeys, that live in the forests of Ethiopia, supply most of the fashionable long monkey fur that trims women's garments. In this group, recently mounted for the Field Museum of Natural History, the way that the animals themselves wear their fur as a natural cape is clearly shown.

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WHERE EARLY CHRISTIANS PASSED

ARCHAEOLOGY

Oldest Christian Chapel Moved Overseas To Yale

THE EARLIEST Christian chapel ever discovered has been moved overseas from Syria and reconstructed in the Yale Gallery of Fine Arts.

The chapel is of extraordinary historic interest, since it dates from the early part of the third century, when Christians worshipped secretly in Rome's catacombs and in such tiny, concealed rooms as this Syrian chapel. On the walls are paintings, showing how early Christians pictured such scenes as Christ healing the lame man at Capernaum, Peter attempting to walk on the water, and the three Marys at the tomb of Christ. A box-like affair is identified as an early baptismal font.

Yale archaeologists who unearthed the chapel in ruins of Dura-on-the-Euphrates, trace its history through several generations of use, ending with Dura's fall in the Persian siege of 256 A. D.

The chapel, they explain, was first merely a secluded room in the home of wealthy Christians, who must have offered it as a safe place for worship in time of Christian persecution.

A generation or two later, when the Christian sect had grown stronger and was more tolerated, the family moved out, leaving the large and elegant house to the Christian community. The archaeologists infer this from finding no trace of stove, cistern, or other household gear. At this time, the rooms were rearranged and walls of the tiny chapel were decorated with their many Biblical paintings.

Other rooms in the house were incongruously left adorned with pagan Bacchic friezes. This suggests to the archaeologists that taste had changed, or else that final siege of the city in 256 interrupted the renovation.

The chapel has been reconstructed under supervision of Herbert Gute, graduate of the Yale School of Fine Arts. Mr. Gute spent two years working in Dura before he undertook the project.

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PSYCHIATRY

Bad Temper, Greed, Ambition, Lead to Mental Breakdown

BAD TEMPER, greed and over-weening ambition are blamed for the bringing on of mental disease, by Henry Collins Brown, historian-founder of the Museum of the City of New York, himself a patient for about three years in a state hospital for mental patients and now recovered.

Mr. Brown's own breakdown occurred when, at the age of 65, he was removed from the Museum in which were tied up all his hopes and dreams and he was replaced by a younger man. He did not "lose his mind," did not become confused in his thoughts, but he entered a long period of depression during which he ceaselessly paced the floor without rest or even a sense of fatigue. During that period he made many illuminating observations of those about him.

"Early in my sojourn I became profoundly impressed with the large number of cases that were what I classed as preventable," Mr. Brown said in summing up these impressions in "A Mind Mislaid," published by Dutton. "That is to say, they were the result of causes that could be avoided. They were the direct and natural consequences of the risks deliberately chosen by the patients themselves. And, of course, when things went wrong, as they invariably did, one or two persons smashed up as a consequence.

"Philandering and excessive drinking furnished the largest contingent of these casualties," Mr. Brown declared.

"Love nests rear nothing but 'cuckoos.' That is a piece of 'bughouse' philosophy worth remembering."

Particularly, Mr. Brown warns against the dangers, mental as well as physical, of intense anger, which he hints had to do with his own troubles. Any feeling so powerful as to take blood from one part of the body and send it scurrying to another puts upon the heart a violent strain, he points out. Persons who let themselves go whenever the impulse moves them are doing themselves a serious injury.

"We have all known men who allow themselves to get in a towering rage over some very trivial matter," said Mr. Brown. "Perhaps if that man knew that he might snap one of the numerous delicate tissues of the brain, causing him to spend his old age in an insane asylum, he might very readily learn to control himself.

"In the case of mature persons, it sometimes happens that an older man feels that he has earned the right to be as crotchety as he pleases. Particularly is this true of the man who has accomplished something and has reached a position of independence. He may have reached the latter state in a financial sense, but at no time has he reached the other. The fact that he can afford to indulge himself is a mistaken idea. Not if he wishes to keep on living and enjoying life for a few more years. . . . Why leave all that you have fought for, struggled for, and now have in abundance? Stay here while you can. Avoid passionate outbursts as you would a plague.

"Now self-control is not an easy matter. Today I can control myself, but who wants to go through what I did to learn a lesson that can be acquired without all that hideous torment and suffering?

"I often think a few weeks spent in an insane asylum would be the greatest panacea for bad temper that could be devised."

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ASTRONOMY

Two Planets Join Summer Stars

Mars and Jupiter Shine in Southern Skies; Occultation of Mars Occurs on July 17

By JAMES STOKLEY

TO THE STARS that shine in the summer, two planets now add their luster. Both are in the southern sky. In the southeast is brilliant Jupiter, in the constellation of Sagittarius, the archer, in which ten stars form a very good outline of a teapot, the spout to the right, the handle to the left. Jupiter is just east of the handle, and its great brilliance makes it easy to find.

Next to Sagittarius, to the right, is Scorpius, the scorpion. The tail curls around, under the spout of the teapot. A prominent red star, Antares, forms the heart, and a curved row of stars near it the claws. Still farther right is Libra, the scales. This is the present location of Mars, also red, but much brighter than Antares, the name of which, incidentally, means "rival of Mars."

Use the Dipper

A good way to find the other bright stars in the evening sky is to start with the Great Dipper, in the north. This familiar figure, part of Ursa Major, the great bear, is shown on the accompanying maps, which depict the skies as they appear at 10:00 p. m., standard time, at the beginning of the month, 9:00 p. m. in the middle, and 8:00 p. m. at the end. It will be seen that the dipper is hanging on its handle, in the northwestern sky.

The stars at the bottom, called Dubhe and Merak, are the pointers, indicating the direction of the Pole Star. By following the curve of the handle, toward the south, one soon comes to Arcturus, in Bootes, the bear driver. Still farther south, along the same curve, is Spica, in Virgo, the virgin. This group is next to Libra.

The brightest star of the summer evening skies, though it is inferior to Jupiter and Mars, is Vega, part of Lyra, the lyre, seen quite high in the east. Below it is the figure of Cygnus, the swan, otherwise known as the northern cross. The cross is on its side, and first magnitude Deneb is toward the north. Below Cygnus is Aquila, the eagle, containing the star Altair.

Last month the most interesting astronomical event was the total eclipse of the sun which was not, unfortunately, visible in the United States. Again during July we just miss seeing a phenomenon which, while not as important as a total eclipse, would be most fascinating to watch. This is an "eclipse" of the planet Mars.

Moon Passes Planet

On July 17 the moon will pass directly in front of the planet, producing what is technically referred to, not as an eclipse, but as an occultation. It will be visible from an area covering most of the north Atlantic Ocean and western Europe and Africa, as well as Labrador and Newfoundland. The moon will then be in a gibbous phase, about two days past the first quarter. Since it moves through the sky from west to east, it will be the dark, eastern edge which will first cover the planet, so a person watching it would find the planet vanishing most mysteriously.

As much as two hours later, at some locations, it will reappear, now from behind the moon's sunlit edge. By the time the moon is high enough to see, even in the eastern part of the United States, the occultation will be over. It will then still be daylight anyhow, and Mars will not be visible, but after dark that evening Americans will be able to notice how close Mars is to the moon.

A few days later, on the 22d, at 3:59 p. m., eastern standard time, the moon will pass Jupiter, but well to the north. On that evening, the full moon, with the brilliant planet near it, will again form an interesting spectacle in the southern sky.

On July 4, at about 10:00 p. m., eastern standard time, the distance from the center of the earth to the center of the sun will be 94,454,200 miles. On New Year's Day we were closest, or at perihelion, with the distance only 91,337,700 miles.

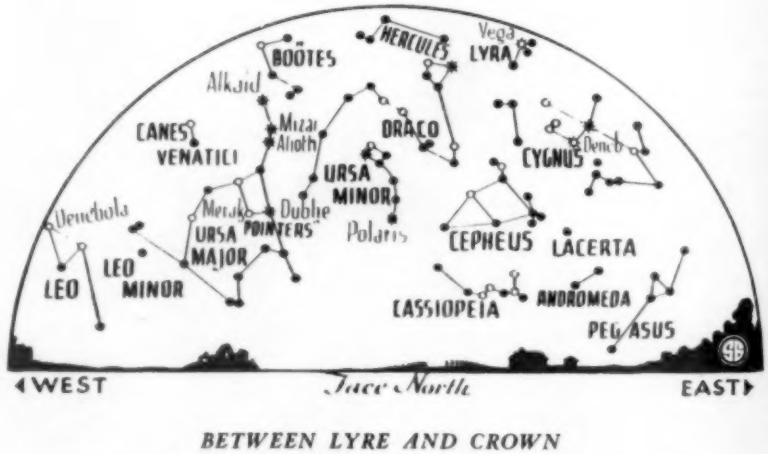
Phases of the Moon

			E. S. T.
Last Quarter	July	1	8:03 a. m.
New Moon		7	11:12 p. m.
First Quarter		15	4:36 a. m.
Full Moon		23	7:46 a. m.

January Heat

This brings out a curious paradox. Naturally, with the sun the sole source of the light and heat of the earth, one would think that we would be warmest when we are closest, and that January should accordingly be our hottest month, with July the coldest. In fact, the earth, as a whole, does get more heat from the sun in January than in July, but there are other factors which counteract this, as far as the northern hemisphere is concerned.

In winter the sun is far to the south,



BETWEEN LYRE AND CROWN

Hercules, near the peak of the heavens, followed by the Swan.

it rises well south of the east point and sets well south of the west point. For us it is above the horizon much less than half of the twenty-four hours. Even at noon it does not rise very high. But in the summer, conditions are just the opposite. The sun rises in the northeast, sets in the northwest, is above the horizon for considerably more than half the day, and climbs to a great height at noon. Because it is in the sky so long, it has much more time to heat the earth. But even more important is the greater height. Its rays, on this account, fall on the ground almost vertically, and are thus more concentrated than when it is low.

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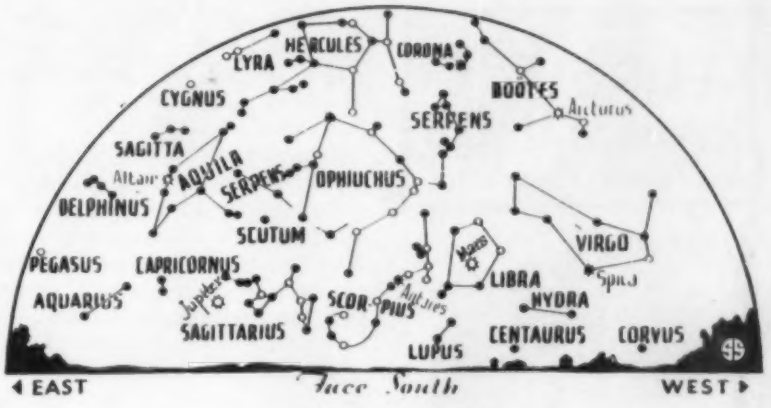

RED PLANET, RED STAR

Antares is not Mars' equal in brilliance and ruddy color.

MEDICINE

Medical Association Ends Birth Control Opposition

THE American Medical Association, after years of refusing officially to countenance birth control, adopted a committee report recommending investigation of methods and materials for contraception and the teaching of birth control procedure in medical schools.

All contraceptive advice, it was recommended, should be given at legally licensed clinics under medical control.

This seems to be in the nature of a triumph for the supporters of birth control movement. It means that physicians need no longer hesitate to give such advice to their patients when in their opinion bearing children would threaten the life or health of the mother or her children.

Only restriction on physicians now in this matter is such as may be imposed by the laws of their particular state.

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Insects living in dark cave recesses in Lehman Caves National Monument, Nevada, apparently are insensible to light but are highly sensitive to vibrations.

Books

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PHYSICS

"Pencil and Paper" Team Set Pace For Cosmic Ray Research

THE mathematical genius of two University of California scientists is now guiding much of the cosmic ray research throughout the world. The "paper and pencil" team of Prof. J. F. Carlson and Prof. J. R. Oppenheimer has developed a new brain child in a theory of how the piercing cosmic rays are absorbed when they hit the upper atmosphere and eventually find their way into the recording instruments of the earth-bound investigators.

A majority of the cosmic ray researches reported at the recent meeting of the American Physical Society in Washington, for example, listed the work of Profs. Carlson and Oppenheimer as references.

The passage of a cosmic ray through the earth's atmosphere is like the return to earth of a 4th-of-July star-burst, according to the picture which physicists now have in mind. The path of the original ray branches out again and again into an ever-increasing number of new rays, called secondaries.

The task of Drs. Carlson and Oppenheimer was to calculate how often this branching-out takes place, how many times it can occur before the energy of the original ray (like the gunpowder in the 4th-of-July bomb) is all used up. Physicists want to know this in order that their observations near the earth's surface may tell them how many rays are coming into the atmosphere from outside.

The branching-out occurs when the cosmic ray particle comes very close to the nucleus of an atom in the air, according to the process which these physicists have calculated. In the intense electric field of the nucleus the cosmic ray particle (electron) generates a powerful kind of X-ray (photon) which in turn, when it comes close to another nucleus, is transformed back into a pair of electrons, charged positive and negative, respectively. The process repeats itself until the energy of the original ray is exhausted.

Another but less frequent kind of branching which Drs. Carlson and Oppenheimer mention in their paper involves the actual destruction of the atom with whose nucleus the cosmic ray collides. This results in a spray of atomic debris and is of the same nature as the transmutations which physicists accomplish with their high voltage atom-splitting machines and cyclotrons.

A current point of discussion among physicists is whether calculations like those made by the California physicists are valid for the tremendously high cosmic ray energies. The question might be, "Do the high-speed electrons from outer space obey the same laws as the electrons in radio tubes?" The tide seems to be turning in favor of the answer "Yes," according to recent reports.

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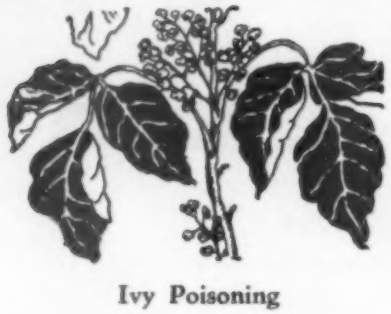
BOTANY

NATURE RAMBLINGS
by Frank Thone



Ivy Poisoning

THE BEST means for preventing ivy poisoning is to stay away from the accursed weed altogether. But in many parts of the country that would mean staying away from all picnics and woodland outings; for the woods are literally full of poison ivy.

Among the best chemical preventives are the salts of iron. These are scientifically sound; they convert the poison of the weed into an insoluble substance that can do your skin no harm. And they have been thoroughly tested by thousands of people—they work for almost everybody.

Get an ounce of ferrous sulphate. Dissolve it in half a pint of water. Add half a pint (or a little more) of alcohol. Wash this mixture freely over face, hands, arms—ankles and legs, too, if you are going barelegged. Let it dry on the skin. (Many persons like to mix a little glycerin into the solution, to keep the skin moist).

When the water and alcohol have evaporated away, go confidently into the woods, never fearing the venomous trifoliate dragons therein. You are clad in armor of invisible iron, and poison ivy cannot harm you.

But if you have already suffered from its malign touch, and are wretched with blisters and itching, there is a different remedy. The thing you need to do now is oxidize the poison—burn away the curse with a cool flame.

Recommended for this use by Dr. James F. Couch of the U. S. Department of Agriculture is a five per cent. solution of potassium permanganate in water, or in water-and-alcohol, as with the iron mixture. You can get your druggist to put it up for you, or you can mix your own—an ounce of the permanganate to a pint of solution is close enough.

Puncture the blisters with a flame-sterilized needle, and swab up their watery contents with absorbent cotton or sterile gauze. Then swab on the permanganate solution. It will sting a bit, but you'd rather stand that than the intolerable itching. It will leave a brown stain, but you can take that off with lemon juice after a couple of hours.

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VOLCANOLOGY

Levees Against Lava Proposed For Hawaii

LEVEES protect mainland American cities against floods of water. But a proposed system of embankments for the city of Hilo, on the island of Hawaii, will be designed to give protection against actual floods of liquid fire.

Hilo lies at the lower end of a long valley, which continues on under the sea to form the city's excellent harbor. That valley, which brings wealth to Hilo, also offers the constant menace of fiery doom. For inland looms the vast bulk of Mauna Loa, which at intervals of about fifty months pours lava flows from vents in its sides.

A couple of years ago Hilo was saved from a dragon-flow of viscous "pahoehoe" lava by a few judiciously planted bombs from Army planes under the directing generalship of Dr. T. A. Jaggar, noted American volcanologist, who has spent a lifetime with the volcanoes of Hawaii and knows them better than most men know their own children.

But, says Dr. Jaggar, it is an ill and risky thing to depend only on Army bombers to stop a lava flow. For one thing, the earlier-flowing, more abundant, highly liquid type of lava called "aa" is far more dangerous and can not be checked by bombing.

So he proposes three deflecting embankments of heavy lava blocks well up the slopes, to deflect the rivers of fire into courses that will take them away from Hilo. A final line of defense would be right at the edge of the city and harbor—a causeway-wall like the wall of a medieval castle, with sliding steel traffic doors that could be shut against the oncoming enemy.

The danger to be averted is not only the possible burning of homes and warehouses. A major flow might fill the harbor with a solid mass of rock, and ruin the city effectually even if it did not start a single fire.

Possible labor is already mobilized in the CCC camps, Dr. Jaggar points out. The public has for several years been in the mood for megalithic works.

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●RADIO

June 29, 4:15 p.m., E.S.T.

SCIENCE TESTS MATERIALS—C. L. Warwick, Secretary of the American Society for Testing Materials, and A. C. Fieldner of the U. S. Bureau of Mines.

July 6, 4:15 p.m., E.S.T.

BABYLONIANS: FATHERS OF SCIENCE—Dr. Waldo H. Dubberstein, Oriental Institute of the University of Chicago.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

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MEDICINE

Employers, Relief Agencies Urged to Help Fight TB

EMPLOYERS and relief agencies were urged to join in the fight against tuberculosis. With their aid, thousands of cases of the disease can be discovered and given much-needed treatment, Dr. A. A. Pleyte of Milwaukee told members of the National Tuberculosis Association at their meeting in Milwaukee.

He and his associates, Harold Holand and Metta Bean, reported that during 1935 over 1,000,000 children in the United States were tuberculin tested under organized auspices and perhaps as many more were tuberculin tested by private physicians.

"Nevertheless," Dr. Pleyte said, "few cases of tuberculosis among children are actually found. The years 5 to 18, relatively speaking, are an island of safety from tuberculosis."

The situation is quite different at higher age levels. The relief population and men in industry make up a smaller population than that of the primary and secondary schools but Dr. Pleyte estimates that these two groups have six times or more the number of active cases of tuberculosis and a tuberculosis death rate from four to eight times that of school children.

The methods of mass testing with tuberculin and X-rays which have proved effective in finding tuberculosis in children should now be applied to finding it in these adult groups, the Milwaukee investigators urged. Such tests, they believe, should be extended until all persons over 20 years of age are X-rayed at least once a year.

"Success in reaching these large groups of apparently healthy adults," Dr. Pleyte said, "will depend largely on how well employers and relief agencies can be pressed into service, as school authorities have already, as allies of the tuberculosis agencies in the organized anti-tuberculosis fight."

Tuberculosis is increasing at an alarming rate among nursing and medical students in several parts of the world, Dr. J. Arthur Myers, University of Minnesota professor, told the meeting.

Medical Students Hit

"In some places it has been observed that the infection attack rate among student nurses, as manifested by the tuberculin test, is 100 times as great as among girls in the same vicinity in the general population," Dr. Myers said. "While we have been priding ourselves over the marked decrease in the incidence of positive tuberculin reactors among children and young adults throughout most of this nation, we have tolerated a situation that has permitted students of nursing and medicine to become infected with tubercle baccilli at a rate no less than probably existed in the general population a century ago."

Doctors now know, Dr. Myers pointed out, that tuberculosis will attack anyone at any age whenever sufficiently exposed to the infection. The remedy for the alarming situation among students of medicine and nursing, Dr. Myers said, is to take greater precautions to protect these students from the infection in the patients they are attending. This means instituting the same strict technic in tuberculosis nursing that is observed for patients suffering from other contagious diseases such as scarlet fever and diphtheria. The patients themselves, he declared, will be more than willing to cooperate and will benefit from seeing this technic practiced.

Silicosis Lets TB Spread

When tuberculosis develops in a patient suffering from silicosis, the lung disease due to inhalation of a silica-laden dust, the tuberculosis is apt to spread to other organs of the body from the lungs, Drs. William M. Kinney of Joplin, Mo., and Jesse E. Douglass of Webb City, Mo., reported.

Three cases of silicosis in which tuberculosis subsequently developed and spread to the heart lining were reported in detail by the Missouri doctors to illustrate their opinion. The tuberculosis spread by a different route from heart to lungs in each of these cases. Other similar cases were also found.

Most usual route of the spread of the tuberculosis, they believe, is through the lymphatic nodes which are generally involved in silicosis.

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FORESTRY

Salt-Seasoning Method Improves Poor Lumber

SALT seasoning methods developed at the U. S. Forest Products Laboratory, Madison, Wis., promise to increase the nation's forest capital by converting species now considered weed trees to valued potential building and cabinet lumber.

The method is a simple one. The green wood is immersed in a bath of common house salt, baking soda, borax or one of several other solutions worked out by the laboratory, then air- or kiln-dried. Types of lumber that have defied all previously tried curing methods yield to the new technique.

Formerly it took a year or more to air-dry 6 by 12 inch Douglas fir to a moisture content of 15 per cent at Madison, and during the drying, surface cracks penetrate to an average depth of 1¾ inches. By the new salt-treatment method, timbers were dried to the same moisture content in 34 days, including eight days in the salt-treating tank and 26 days in a dry kiln. The cracks were confined to knots; otherwise the timbers were perfect.

Because wood dries from the inside out when chemically seasoned it is impossible for it to surface-check or crack in drying. In ordinary seasoning, wood dries from the outside in, and often checks.

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SEASICKNESS
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•First Glances at New Books

Sociology

SOCIAL AND CULTURAL DYNAMICS, VOL. II: FLUCTUATION OF SYSTEMS OF TRUTH, ETHICS AND LAW—Pitirim A. Sorokin—*American Book Co.*, 727 p., $6, with vols. 1 and 3, $15 set. The second volume of a comprehensive three-volume survey of the main types of culture of the last 2,500 years, written by the chairman of the Department of Sociology at Harvard University, who has been formerly a Russian itinerant laborer and artisan, lawyer, author, newspaper editor, and statesman. Dr. Sorokin undertakes the courageous task of listing in this volume the "thinkers for each period, with the value given to each on a scale of one to twelve." A number of modern authors are included in the list, but "for obvious reasons values are not given for living authors."

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Psychology

OUR CHILDREN IN A CHANGING WORLD: AN OUTLINE OF PRACTICAL GUIDANCE—Erwin Wexberg with Henry E. Fritsch—*Macmillan*, 232 p., $2. What children will become when they are adults depends upon the things that happen to them after they are born and before they grow up. This is the thesis of this handbook of child guidance. The senior author is professor of neuro-psychiatry at Louisiana State University and Director, New Orleans Institute for Child Guidance.

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Education

CALIFORNIA TEST OF MENTAL MATURITY—Elizabeth T. Sullivan, Willis W. Clark and Ernest W. Tiegs—*Southern Calif. School Book Depository*, Per pkg. of 25 tests, $1.25 plus postage; Specimen set, 25c. This diagnostic mental test consists of four batteries: Pre-Primary, Primary (grades 1-3), Elementary (grades 4-8), and Advanced (grades 7 to college sophomores). Each battery consists of 16 individual tests, from which may be computed not one but three I.Q.'s. These are: a non-language I.Q., a language I.Q., and the I.Q. characteristic of the ordinary intelligence test.

Science News Letter, June 26, 1937

Genetics

HOW TO BREED DOGS—Leon F. Whitney—*Orange Judd*, 338 p., illus., $3.50. The book starts with general considerations of biology and genetics, then applies these principles to the special problems of genetics in dogs and practical dog breeding. Every kennel owner (even if the kennel contains only one good dog) should acquaint himself with the information herein.

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Psychology

FACTORS DETERMINING HUMAN BEHAVIOR—Edgar Douglas Adrian and others—*Harvard Univ.*, 168 p., $2.50. (Harvard Tercentenary Publications no. 1.) Here are gathered some of the many interesting addresses contributed by scientists all over the world to the Harvard Tercentenary Conference. This one of the three companion volumes will interest particularly psychologists, educators, and psychiatrists.

Science News Letter, June 26, 1937

Ethnology

A BLACK CIVILIZATION: A SOCIAL STUDY OF AN AUSTRALIAN TRIBE—W. Lloyd Warner—*Harper*, 594 p., illus., $5. A detailed and scholarly study of those Australian aborigines known as the Murngin, written by the associate professor of anthropology and sociology in the University of Chicago.

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Zoology

THE BOOK OF ANIMAL LIFE—Thora Stowell and Thornton W. Burgess—*Little, Brown*, 315 p., illus., $2.50. Animal life is taken up in conveniently divided topics; senses of animals, coats of animals, weapons of animals, etc. Treatment of each topic is clean-cut and straightforward, in language simple enough for rather young children, yet in style attractive enough to hold adult readers. It tells more than most school texts do, yet avoids all scent of textbookiness.

Science News Letter, June 26, 1937

Mechanics

PROBLEMS IN MECHANICS, BASED ON THE COLLECTION OF I. V. MESCHERSKY—G. B. Karelitz and J. Ormondroyd—*Columbia Univ. Press*, 155 p., $2. Over five hundred problems which will provide plenty of practice for engineering students taking mechanics.

Science News Letter, June 26, 1937

Mathematics

NEW SOLID GEOMETRY—John C. Stone and Virgil S. Mallory—*Sanborn*, 301 p., $1.36. A new text emanating from the New Jersey State Teachers College.

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Psychiatry

THE BIOLOGY OF HUMAN CONFLICT: AN ANATOMY OF BEHAVIOR, INDIVIDUAL AND SOCIAL—Trigant Burrow—*Macmillan*, 435 p., $3.50. Probably too technical to be of wide popular appeal, this philosophical discussion by the scientific director of the Lifwynn Foundation will interest particularly those dealing with mental abnormality either in individuals or social groups. One step in advance of those who preach study of the "individual as a whole," the author urges the study of man as a phylum or part of the human race and deplores the tendency to pursue abstraction and symbols until contact with reality is lost.

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Sociology

INTERRACIAL MARRIAGE IN HAWAII: A STUDY OF THE MUTUALLY CONDITIONED PROCESSES OF ACCULTURATION AND AMALGAMATION—Romanzo Adams—*Macmillan*, 353 p., illus., $4. Strangely diverse races have mingled freely for nearly a hundred and fifty years on the eight inhabited islands of the colorful Hawaiian archipelago. The author, a professor emeritus of sociology at the University of Hawaii, studies this great melting pot and shows the rôles of such forces as immigration, religion, divorce and education, in the mixed and developing society.

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Engineering

SENTINEL OF THE COASTS: THE LOG OF A LIGHTHOUSE ENGINEER—George R. Putnam—*Norton*, 368 p., illus., $3.50. The former Commissioner of Lighthouses tells the interesting story of the beacons upon our seashores that protect our shipping. An autobiographical account.

Science News Letter, June 26, 1937

Electricity

GENERAL ELECTRICITY—E. W. Jones—*McCormick-Mathers Co., Wichita, Kansas*, 89 p., 80c. From Kansas State Teachers College, for a practical and elementary high school course.

Science News Letter, June 26, 1937

Chemistry

MODERN EVERYDAY CHEMISTRY—Ralph E. Horton—*Heath*, 451 p., illus., $1.68. A new text by the Chairman of the Department of Science, Seward Park High School, New York City.

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